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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/766,896	01/22/2001	Hidemitsu Aoki	WAM-03401	2616

26339 7590 01/15/2004

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EXAMINER	
DEO, DUY VU NGUYEN	
ART UNIT	**PAPER NUMBER**
1765	

DATE MAILED: 01/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/766,896	AOKI ET AL.	
	Examiner	Art Unit	
	DuyVu n Deo	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-14,16-20,22-26,28 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-14,16-20,22-26,28 and 29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morinaga et al. (US 5,885,362) and Tanabe et al. (US 6,068,000).

Morinaga describes a method for cleaning semiconductor, metal, and glass surfaces using a solution comprising pyrogallol (hydroxy aromatic compound), urea and its derivatives, dimethylenethanolamine (alkanolamine), and water (col. 3, line 37-42; col. 5, line 10-12; col. 7, line 22; col. 8, line 34-40). Even though Morinaga doesn't describes stripping of resist or etching residues from the semiconductor substrate having exposed metal film. However, he teaches using the solution for cleaning/etching of semiconductor, metal, and glass surface (col. 13, line 55-63); therefore, it would have been obvious at the time of the invention for one skill in the art to use the solution in cleaning etching residues from the semiconductor wafer having exposed metal film in order to obtain a clean wafer.

Since Morinaga's solution contains the same two ingredients, hydroxyl aromatic compound and urea/urea derivative as that of the claimed invention, these two components would also supplement each other to form a coating layer that imparts hydrophobicity to the exposed metal film.

Unlike claimed invention, Morinaga doesn't describe a water-soluble organic solvent Tanabe describes a solution for cleaning or removing degenerate resist on a metal where he teaches using water soluble organic solvent (summery, col. 5, line 45-59). It would have been obvious for one skilled in the art to add a water-soluble organic solvent in light of Tanabe because Tanabe teaches that it would exhibit a high anticorrosive effect for metallic films.

Referring to claim 11, as shown in Morinaga, the amount of each of compound in the solution is determined through test runs in order to see the effective of various concentrations. Therefore, they are result-effective variables and would have been obvious for one skilled in the art to determine the compound concentrations through routine experimentation to achieve optimum concentration in order to clean the wafer with a reasonable expectation of success. See *In re Boesch*, 617 F .2d 272, 205 USPQ 215 (CCPA 1980).

3. Claims 16-20, 22-26, 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morinaga, Tanabe, and Zhao et al. (US 6,204,192).

Unlike claimed invention, Morinaga is silent about prior steps forming a semiconductor wafer including steps of forming a metal film (copper), 1st dielectric film, and resist or 2nd dielectric film; etching the 1st dielectric layer using the resist film or 2nd dielectric layer as a mask to expose the metal layer. However, these steps are well known to one skill in the art as shown here by Zhao (fig. 2; col. 4). It would have been obvious to one skill in the art at the time of the invention that Morinaga's method can be used in any semiconductor process, such as a single or dual damascene process taught by Zhao, because Morinaga teaches that his solution can be used to clean/etch semiconductor substrate and prevents a substrate from being deposited with metal impurities (col. 3, line 13-18).

Response to Arguments

4. Applicant's arguments, see pages 15-16 of the remark, filed 11/03/03, with respect to reference of Small have been fully considered and are persuasive. The rejection depending on Small reference has been withdrawn.

Referring to applicant's argument that Morinaga doesn't describe stripping resist or organic layers with exposed metal, as shown in col. 13, line 55-60 and col. 14, line 4, Morinaga teaches of cleaning metal surface so that if is not contaminated with organic materials. Since it is well known to one skill in the art that resist materials are organic materials. Therefore, it would have been obvious for one skill in the art to use the solution to clean the resist, or organic material, from the metal surface.

Referring to applicant's argument that Morinaga teaching of the concentrations of complexing agents are too small to form a coating layer on the surface that imparts hydrophobicity. Morinaga suggests the concentration of each complexing agent added can be up to 2 wt% (col. 12, line 37-43) and page 10, line 14 and page 12, line 5 of the specification show that the concentrations of each of the components, which is the same as Morinaga's complexing agents, have a very good corrosion inhibitability and they are at 1% by mass and 0.1% by mass. Therefore, Morinaga's concentrations of the complexing agents would certainly enough to impart hydrophobicity.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD
January 6, 2004

SUPERVISOR
NADINE G. NORTON
PRIMARY EXAMINER